Rust disease on sweet aromatic shrub *Aloysia virgata* in Brazil, caused by *Prospodium paraguayense*

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Abstract. A rust disease caused by *Prospodium paraguayense* was observed on leaves of the sweet aromatic shrub *Aloysia virgata* collected in a fragment of Atlantic forest in the municipality of Viçosa, Minas Gerais, Brazil. This is the first record of *Prospodium paraguayense* on *Aloysia virgata* in Brazil.

Aloysia virgata (Ruiz & Pav.) Pers. (Verbenaceae) also known as ‘lixa’ or ‘lixeira’ is a large aromatic shrub found throughout the greater part of the Brazilian states of Bahia, Espírito Santo, Rio de Janeiro, Minas Gerais, Mato Grosso do Sul, São Paulo and Paraná (Lorenzi 2000). Due to an abundance of flowers and continuous flowering during the year, this plant is considered to be a good source of nectar for bees (Santos 1999). In addition, some interesting essential oils can be obtained from its leaves, such as germacrene D, β -caryophyllene, bicyclogermacrene and α -humulene (Pino *et al.* 2004).

In April 2009, plants of *A. virgata* showing symptoms of rust disease were found in the ‘Reserva Florestal da Mata do Paraíso’, Universidade Federal de Viçosa, Viçosa, state of Minas Gerais, Brazil. Samples of infected leaves were collected, photographed and dried in a plant press. Observations and measurements were carried out by means of a Carl Zeiss Standard W light microscope (Göttingen, Germany) and photographs by means of an Olympus BX 51 light microscope (Tokyo, Japan) fitted with an Olympus EVOLT E330 digital camera (Tokyo Japan). Wherever possible, 30 measurements were made of the structures mounted in lactophenol.

Taxonomic description: *Prospodium paraguayense* (Speg.) Speg., *Revista Argentina de Botánica* 1, 93–145, 1925

Spermogonia and aecia unknown. Uredinia on the abaxial leaf surfaces (Fig. 1), subepidermal in origin, erumpent, pale cinnamon-brown, with inconspicuous, cylindrical, thin-walled paraphyses; urediniospores $17.5\text{--}24.0 \times 15.0\text{--}19.0\ \mu\text{m}$, broadly ellipsoid or globoid, wall $1.0\ \mu\text{m}$ thick, golden to pale cinnamon-brown, uniformly echinulate (Fig. 2). Telia as the uredinia but red brown to dark brown, pulverulent; teliospores $27.5\text{--}37.5 \times 20.0\text{--}25.5\ \mu\text{m}$, oblong-ellipsoid, slightly constricted at septum, wall not bilaminar, $2.0\text{--}4.0\ \mu\text{m}$ thick at sides, chestnut brown (Fig. 3), but with pale umbos thick over pores, strongly echinulate with broad cones spaced, pore apical in upper cell, near pedicel in lower cell, each with a conspicuous umbo; pedicel $15.0\text{--}31.0 \times 2.5\text{--}6.0\ \mu\text{m}$ colorless, with a pair of

Fig. 1. *Prospodium paraguayense* ex *Aloysia virgata*. Detail of rust diseases symptoms on abaxial leaf surfaces.

branched appendages approximately midway and sometimes also basally or the lower portion simple and somewhat inflated.

Material examined: Vic. 31267, on leaves of *Aloysia virgata* (Ruiz & Pav.) Pers., Reserva Florestal da Mata do Paraíso, Viçosa, State of Minas Gerais, Brazil, D. B. Pinho, 13 April 2009.

Two species belonging to the genus *Prospodium* are known to occur on *A. virgata* viz., *Prospodium lippiae* (Speg.) Arthur, reported in Argentina and *P. paraguayense* in Paraguay (Hennen *et al.* 2005; Farr and Rossman 2010). *Prospodium lippiae* is reported in Brazil on *Lippia lupulina* Cham. and *Lippia* sp. while *P. paraguayense* is described on

Fig. 2. *Prospodium paraguayense* ex *Aloysia virgata*. Golden to pale cinnamon-brown urediniospores mixed with teliospores. Arrows show urediniospores. Bar = 25 μ m.

Fig. 3. *Prospodium paraguayense* ex *Aloysia virgata*. Chestnut brown strongly echinulate teliospores. Bars = 25 μ m.

Lippia sp. and *L. urticoides* (Cham.) Steud. (Hennen *et al.* 2005; Farr and Rossman 2010; Mendes and Urban 2010). The biometric measurements and morphological characteristics of the rust fungus found on *A. virgata* matched with the

description of *P. paraguayense* and differ from *P. lippiae* by its smaller length and width of the teliospores (Hennen *et al.* 2005). Since the rust disease caused by *P. lippiae* can affect the essential oil composition of *A. polystachya* (Griseb.) Moldenke by increasing the content of carvone and decreasing the percentage of α -thujone (Cabanillas *et al.* 2003), this rust disease caused by *P. paraguayense* may also influence the essential oil composition of *A. virgata* and can become an important disease for the commercial production of this species. This is the first report of *P. paraguayense* on leaves of the sweet aromatic shrub *A. virgata* in Brazil.

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